



Imperial Institute of Ceramics Science and Technology, Vadodara

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Syllabus

6 months Certificate Course in Ceramic Technology

Through Distance Learning

With specialization in (a) Ceramics (b) Refractories (c) Glass (d) Technical Ceramics (e) Enamel (f) Cement Tech

Eligibility:-

Condition for admission to the Certificate courses shall be required to have passed in 10th Science Examination of the State Board of Secondary Education or CBSE, any other Examination recognized as equivalent to the above by the Board of Secondary Education, Diploma in Engineering or Technology, B.Sc. or M.Sc. The candidate should have minimum 1 year of working experience in Glass, Ceramic or allied industries.

Note: In addition, at the time of admission the candidate will have to satisfy certain minimum requirements, which may be prescribed from time to time.

Subjects:-

	Full Marks	Pass Marks
A. Course one (3 months)		
1. Ceramic Technology – an overview	100	45
2. Ceramic Raw Materials – Geology and Mineralogy	100	45
3. Ceramic Equipment's and Machineries	100	45
4. Fuel, Furnace and Pyrometry	100	45
B. Course two (3 months)		
1. Silicate Chemistry	200	90
2. Specialization paper 1 from below mentioned subjects	200	90
a. White ware and Heavy Clay ware		
b. Technical Ceramics		
c. Refractories		
d. Glass		
e. Enamel		
f. Cement Tech		

Other Norms:-

- Every student will receive the self-study materials in soft copy or hard copy on admissions
- Every three months assignments will be sent to students and they have to complete the same
- Assignments will be of 40 marks in each subject.
- Course-end examinations will be of 60 marks.
- Putting together assignment's marks and year end examination pass marks will be 45 out of 100
- Those securing 45 % and above will be placed in Second division.
- Those securing 60 % and above will be placed in First division.
- Those securing 75% and above will be placed in First division with distinction and will receive special appreciation from Director of the institute.
- Examination center – Vadodara and Rajkot in India.
- For out of station candidates examination will be conducted online.

Compulsory Papers

Ceramic Technology – an overview:

What is Ceramics? Definitions, History of Ceramics, Evolution of Ceramic Technology, brief knowledge about Ceramic materials , Terracotta , White wares , Earthen wares , Stone wares , Hotel China , Bone china , Tiles , Sanitary wares , Dental Ceramics , bricks, cement, tiles, pipe and glass; the glassware, pottery, spark plugs ; electrical insulators, cutting tools and bearings, turbine blades, electronic ceramics (magnetic, memory systems, and microwave devices), protective and refractory coatings for metals, glass products, abrasives, and fuel elements for nuclear energy

Ceramic Raw Materials – Geology & Mineralogy:

Definition of Geology, Petrology and Mineralogy, Ceramic minerals, Ceramic Clays and their classification, Physical properties of Clays, Grog and its properties, Types of Silica Minerals, Types of Alumina Minerals, Feldspar group Minerals, Carbonate minerals, Bone ash, Fly ash etc . Study of Ceramics raw material dictionary.

Ceramic Equipment and Machineries:

Machineries and plants used in ceramic manufacturing , Crushers , grinders , mixers , ball mills , blungers , ceramic pressure pumps, filter presses , spray dryers , pug mills , extruders , jigger jolly , casting molds , presses , dryers , kilns and furnaces , ceramic laboratory equipment.

Fuel, Furnace and Pyrometry:

Construction and working of Industrial Pyrometers, furnaces used in glass industry, enamel industry, Kilns used in Ceramic industry, Types of fuels, Advantages and disadvantages of different physical state of Fuels, Combustion, Classification of fuels, NCES & RES, Hydrogen gas etc.

Silicate Chemistry:

Introduction, Types of colloids, Attractive surface forces, Electrostatic, Steric and electrostatic stabilizations, Structure of consolidated colloids. Detailed study of rheology of ceramic systems, Particle sol-gel processing, Technical porcelain, magnesium silicate, mullite ceramics, alumina ceramics, steatite, cordierite.

One paper from following as specialization Paper

White ware and Heavy Clay ware:

Machinery and equipment used in ceramic industry, Body preparation, Fabrication methods. Drying of Clay products, setting and Firing of Clay products. Classification of Earthenware, Porcelain ware, Special Porcelain ware, Bone china, Sanitary ware, Heavy Clay ware, Floor and Wall Tiles. Glazes, Frits, Colors and decoration. Quality control, Ceramic Laboratory .

Technical Ceramics:

Purification of raw materials, shaping techniques, and firing techniques, Electrical Ceramics, Electronic Ceramics, Ceramic Composites, Magnetic Ceramics, Nuclear Ceramics and other Structural Ceramics. Stabilized Zirconia and products, Alumina products, Ceramic Laboratory.

Refractories:

Classification, properties and fabrication techniques of Refractories, Insulating Refractories, Kiln furniture and accessories, Refractory Cements and mortars , Alumino silicate Refractories, Silica Refractories, Dolomite Refractories, Magnesite Refractories, Chrome-Magnasite Refractories, Mag-Chrome Refractories, Carbon Refractories, Chromite Refractories. Super Refractories properties and uses, refractory laboratory.

Glass:

Raw materials, Classification of glass making raw materials, Batch preparation, weighing, mixing, Conveying and Charging, Glass melting process, Types of furnaces, Types of fabrication techniques for Containers, Sheet glass, Float glass, optical glasses, safety glass, Tubes, Annealing, Tempering, Decoration, Testing and Quality Control of glass, Special glasses, Heat resistant glasses, Fiber glass, Glass ceramics, Glass Laboratory.

Enamel:

Raw materials, Enamel Compositions, Batch preparation, Metal treatment of enamels, Application of enamel and firing of enamels, Defects and decoration, Batch compositions of glazes, Glaze preparation, Firing, Defects and testing of Lead glazes, Leadless glazes, Feldspathic & Calcareous glazes, Enamel laboratory.

Cement Tech:

Raw materials lime stone and limes, Batch preparation, Mixing, Types of manufacturing process, Natural Cements, Portland Cements, Special Cements, and Rotary kilns, Cement laboratory (Physical Testing and Chemical Analysis) .